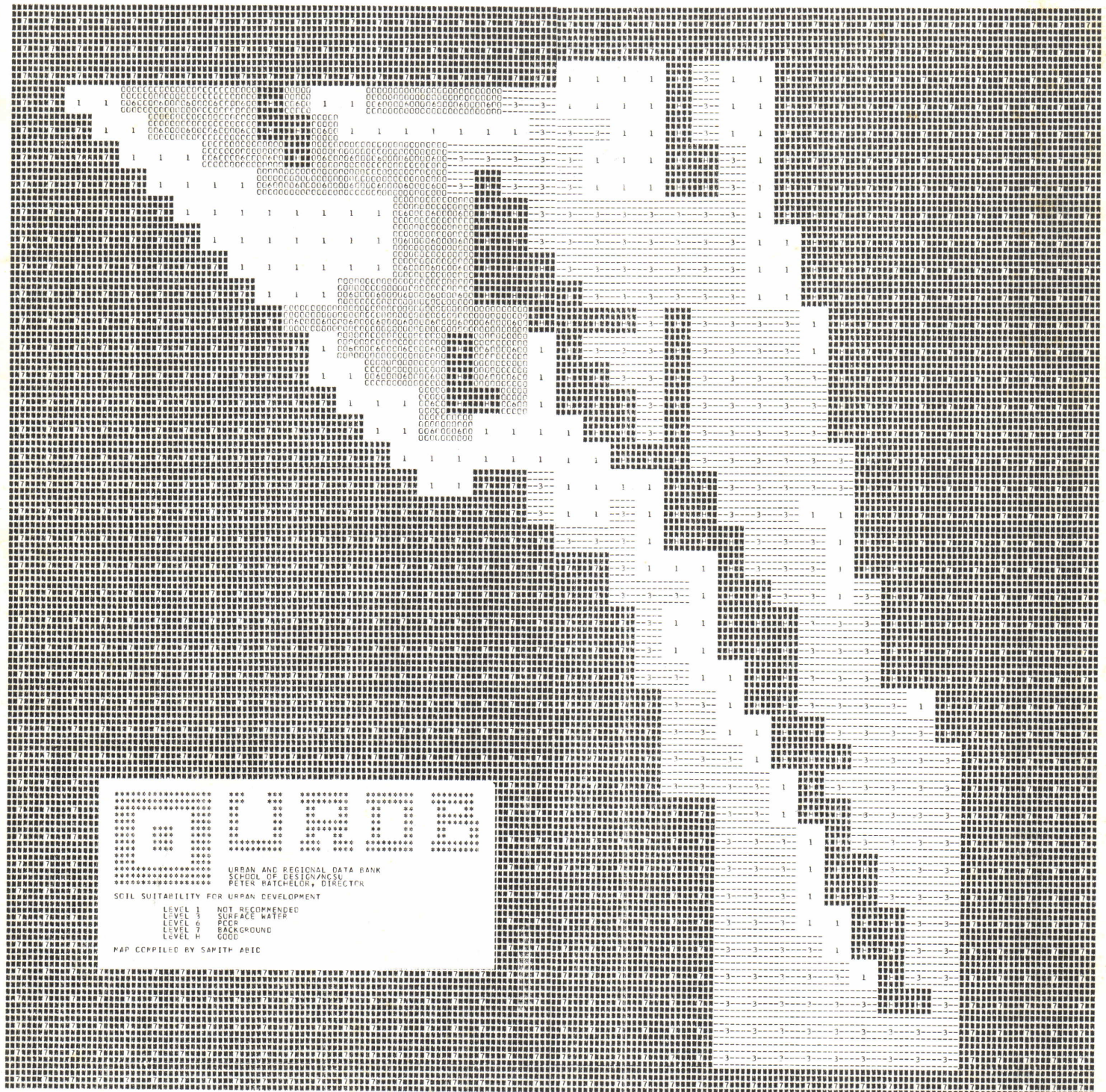


# NORTH CAROLINA ARCHITECT

MAY/JUNE 1973







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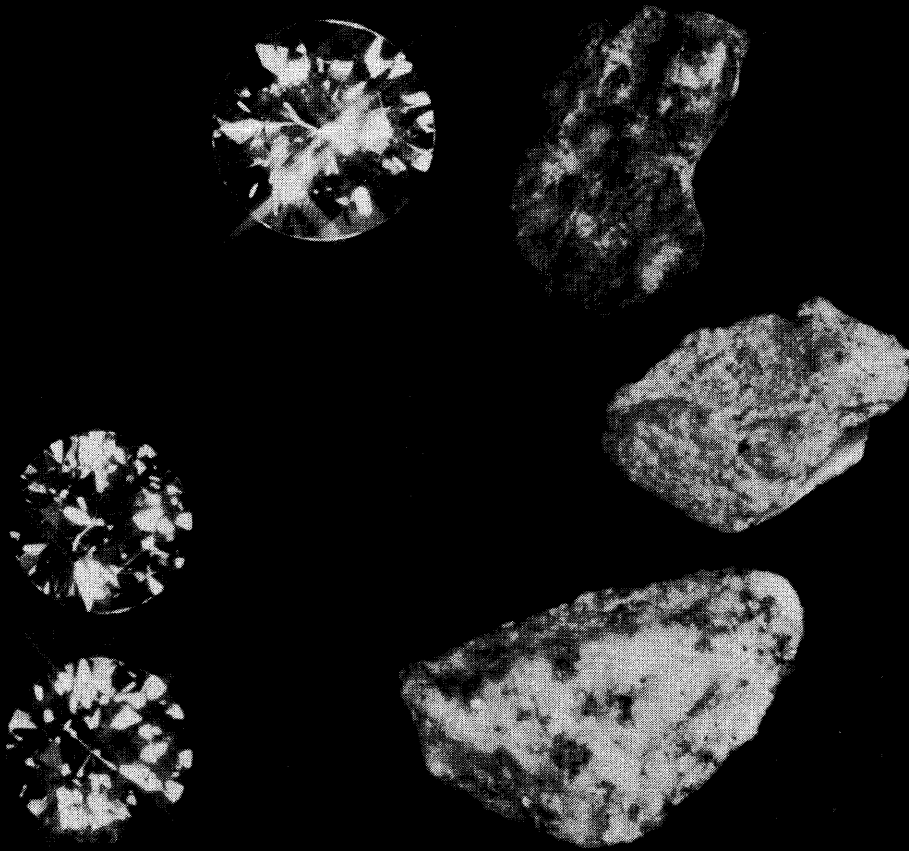


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# NORTH CAROLINA ARCHITECT



MAY/JUNE 1973  
VOL. 20, NOS. 5 & 6

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North Carolina Architect is published by the North Carolina Chapter of The American Institute of Architects, Mrs. Betty W. Silver, Executive Director, 115 W. Morgan Street, Raleigh, North Carolina 27601. Advertising rates on request.

North Carolina Architect was formerly published as Southern Architect, Volume I, No. 1, through Volume XI, No. 11, 1954-1964.

Opinions expressed by contributors are not necessarily those of the North Carolina Chapter of the American Institute of Architects.

Lithographed by Theo. Davis Sons, Inc., Zebulon, N. C.

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## Wheatley Named AIA Fellow

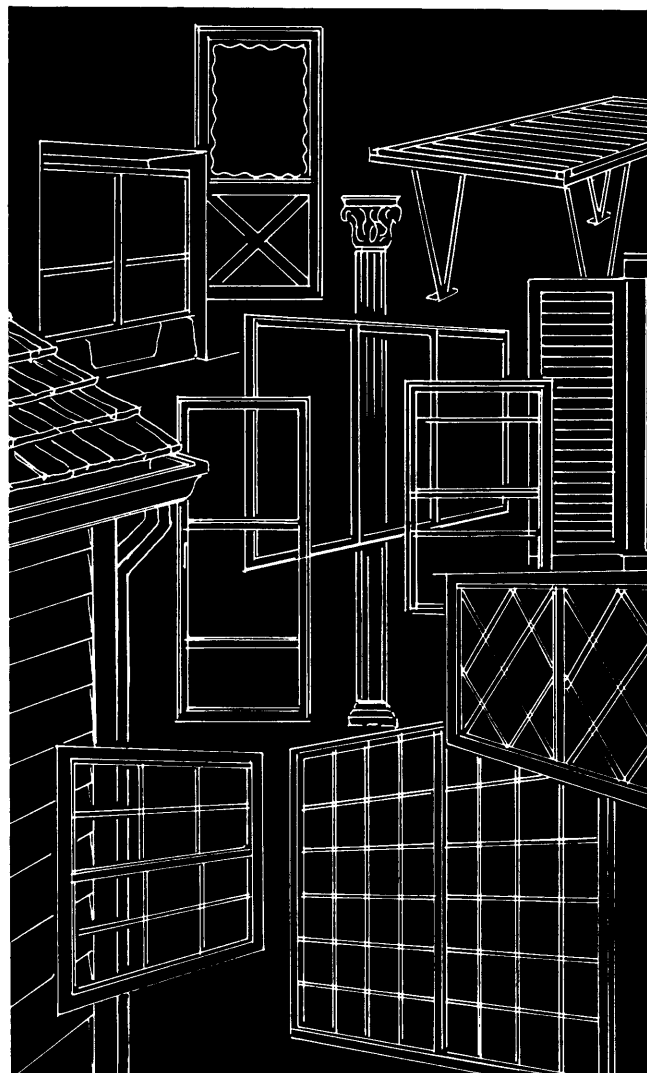
Charles H. Wheatley, architect of Charlotte, has been chosen for one of his profession's highest honors, election to the College of Fellows of The American Institute of Architects.

Fellowship is a lifetime honor bestowed for outstanding contribution to the profession. Investiture of the 64 newly elected fellows took place on May 7 at the Institute's annual convention in San Francisco, May 7-10. (All fellows of the AIA may use the initials FAIA after their names.)

Design recognition has been given to public, commercial and residential structures produced by Wheatley/Whisnant Associates, in which Wheatley is principal partner. The North Carolina Chapter of the Institute honored the firm in 1960 for its design of the Mecklenburg County Office Building. Most recent AIA awards were for the design of a residence in Charlotte and a commercial science and service center.

Wheatley has held the presidency and other offices of the Charlotte Section of the AIA and has been vice president and a director of the North Carolina Chapter. He has been a director and vice president of the Architectural Foundation and the North Carolina Design Foundation and was for five years an officer and member of the North Carolina Board of Architecture. He was a founder of *The Southern Architect*, and *The North Carolina Architect*.

From 1963 to 1969, Wheatley was a member of the North Carolina Atomic Energy Advisory Commission.



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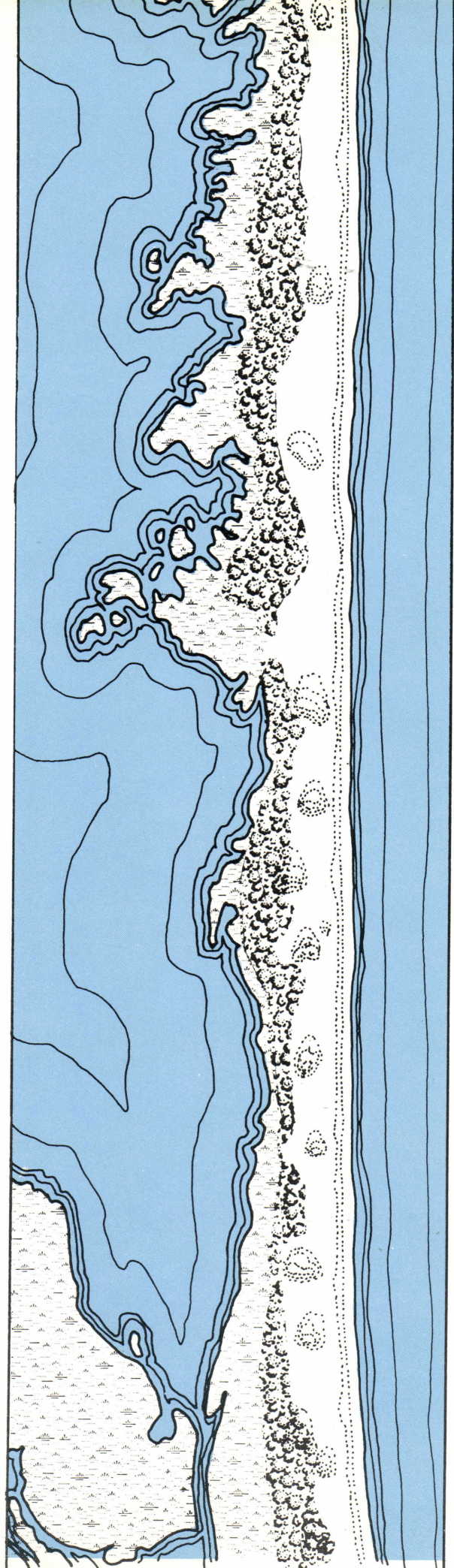
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**INTERDISCIPLINARY  
TEAM  
DESIGN AND  
PLANNING  
FOR  
COASTAL  
DEVELOPMENT**







## **INTERDISCIPLINARY TEAM DESIGN AND PLANNING FOR COASTAL DEVELOPMENT**

PETER BATCHELOR A.I.A., A.I.P.

Development pressure is causing irreversible changes on the nation's coastal lands. North Carolina's shoreline still has some wilderness areas, but massive recent land speculation leaves doubts about the effectiveness of its resource management processes. One year ago a moratorium was placed on new development in Currituck County while an interdisciplinary team of architects, planners, engineers, ecologists, economists and public officials created a comprehensive planning and resource management system. This study deals with the complex sets of variables and real-world issues faced by the team.



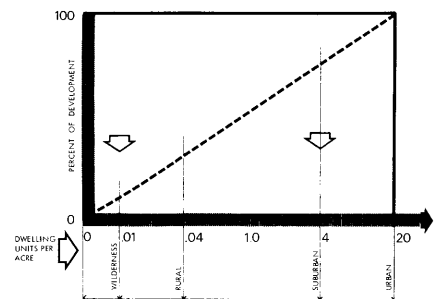
## COASTAL DEVELOPMENT ISSUES IN FOCUS

While the concentration of the nation was focused on urban environments and their central city and suburban development problems, another pressure was building up along the coast. Born of middle class affluence, a new super city reaching from Maine to Florida was rapidly evolving. This shoreline megalopolis is rarely more than six blocks wide—a factor attributable to the high amenity value of views and access to the beach—and for several hundred miles its width is limited by the structure of the off-shore banks. Its main function is recreation for the urban populations of the nation, although many communities do exist within this development pattern with economies based on fishing, shipping and other marine-related industries.

Current literature tends to deal with this phenomenon as a series of loosely-related vacation home developments. These developments, we are told, are characterized by a high degree of land speculation, unstable community structures, low quality of building construction, and inadequacy of municipal services. Since most of the analytic thrust of planning has been directed towards cities, there is an official tendency to regard coastal development as something remote from the urban hub of industrial and commercial vitality. However, the rapidity of development and its permanency compels the citizen, the professional and the legislator to take another look at the coastal land.

One of the best ways for the concerned citizen to view what is in store for North Carolinians is to visit the New Jersey shoreline. There, on an off-shore banks situation very much the same as the Outer Banks of this state, one finds fully developed tourist towns catering to a three-month vacation crowd. Cramped cottages of minimum construction quality often command rents ten times higher than their big-city counterpart. Beaches are very crowded, and in some cases accessible to the tourist only if he or she is willing to purchase a license. Lineups at restaurants and stores are a way of life there, owing to lack of year-round business and subsequent low levels of investment in the quantity and quality of commercial facilities. Prices are so much higher than in urban areas that an economy-minded family will find it cheaper to take a week's supply of groceries on their vacation. Looking rather broadly at a typical coastal community one finds little wealth on the basis of permanent economic vitality. In addition, municipalities are often unable to extract sufficient revenue to pay for essential community services. It seems as if the only winner in the situation is the land speculator and real estate dealer capitalizing on the lust for land.

### Shoreline Megalopolis: A 1500 Mile Super City



These photographs illustrate the two extreme kinds of landscape character to be found on North Carolina's coastline—wilderness and suburban. The diagram above shows that the apparent character of the landscape is a function of intensity of development.

The most dramatic aspect of coastal development is the permanent destruction of scenic areas and ecologically significant lands. Typical platting procedures ignore the acute sensitivity of the environment to human change, and it is very common to see dunes leveled by bulldozers, natural vegetation uprooted, lands dredged and filled, and protective walls raised, everywhere against the sea. Use of the expression "vacation home developments" may make it easier for us to think of them as forming temporary communities, but there is substantial evidence to show that they quickly become permanent, especially if they happen to be within once-a-day or once-a-week commuting distances of large urban centers.

### **The Coastal Ecosystem**

Three distinct physiographic regions comprise the geography of the coastal ecosystem: The Banks, the Sound and the Wetlands. Their interdependence produces a complex variety of marine and aquatic life, vegetation and surface land patterns. It is a system of great fragility, susceptible to very small intrusions of human existence.

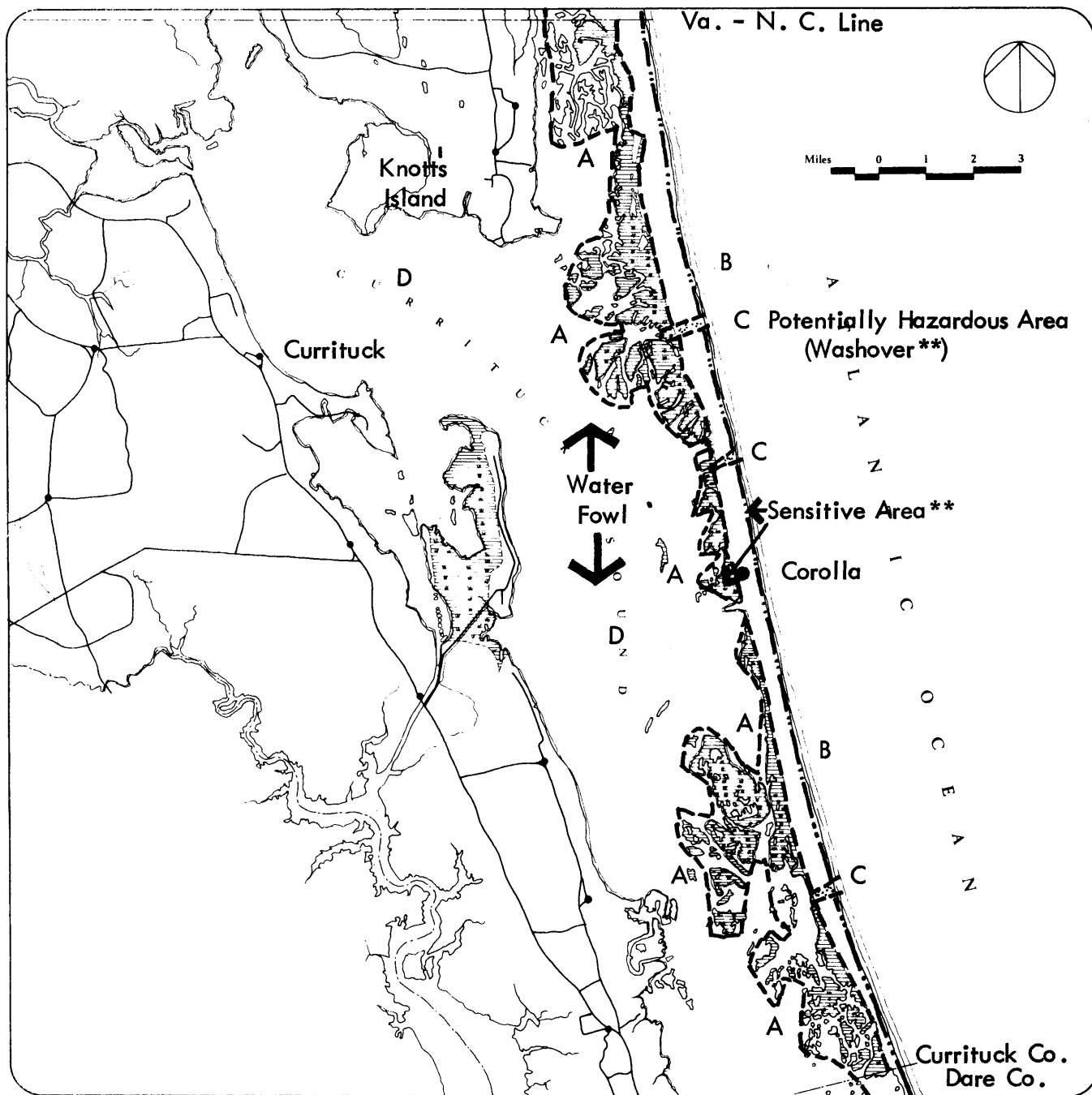
The Banks, barely as old as recorded history, are the product of wind and water currents on sand. As a sand bar built up above the surface of the water, grasses and shrubs borne as seeds by shoreline birds gradually began to knit the Banks together. Nevertheless, the Banks are a dynamic entity, shifting, growing and shrinking over time as wind and water action fashion the dunes. The Sound is a shallow body of mostly fresh water subject to a very small amount of tidal activity. Formed as a result of the barrier action of the Banks against the ocean, the Sound acts as a large channel into which drain all the rivers and creeks of the mainland. Finally, the Wetlands are those lands which form the transition from water to dry land: Marshes, tidal flats and wash-over areas. Taken together these three areas produce the ecosystem of the coastal lands. It is an environment of great natural beauty. Man recognizes this by choosing to recreate these, but in doing so he sets in motion the laws of irreversible change.

### **Currituck County**



Currituck is a county located in the extreme north eastern corner of North Carolina. A typical coastal environment, it has been the subject of much interest since the introduction last June of a one-year moratorium on new development. With a permanent population of 9000 persons and a virtual wilderness for most of its twenty-three mile shoreline, Currituck has experienced a dramatic rise in subdivision planning and mobile home development in the last two years. Furthermore, land speculators with an eye on quick sales to residents of the Virginia Beach, Norfolk and Washington, D. C. areas have been cutting large pieces of the Currituck Banks into rectilinear lots of  $\frac{1}{2}$  acre each. If present plans were to be realized, a population of at least 15,000 families would invade the Banks for the summer months.





**Currituck County Physiography.** This map shows the three components of the coastal ecosystem: Banks, Sound and Wetlands. Items A, B, and C refer to marsh areas, ocean and washover areas—all part of the Coastal Wetlands. D represents the Sound, which in Currituck County possesses a salinity of about 4%. The strip remaining between the Wetlands and Sound represents the Banks. Of all the parts of the system, the Wetlands possesses the greatest sensitivity to change and is unsatisfactory for development purposes.



**Currituck Banks.** This illustration shows more clearly the characteristics of the natural system upon which development is superimposed. Perhaps no more than 50% of a typical site represents buildable land, yet speculative development often runs across stabilizing vegetation and dunes in an attempt to maximize the number of lots to be sold. This is the landscape upon which the nation is building its "super city" from Maine to Florida.



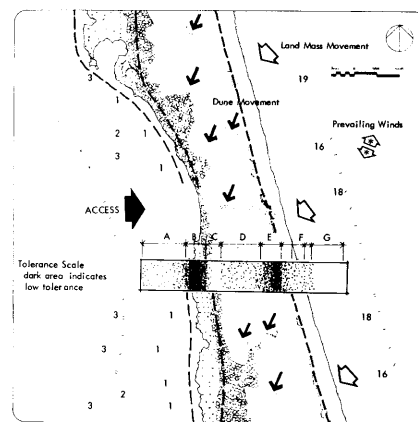
Combined with mainland developments, Currituck presents an alarming picture of uncontrolled growth and inadequate public services. It is in this context that an interdisciplinary team began to analyze the development pattern in May 1972 with the objective of creating an environmental resource management system for the county. The system would guide growth and change along ecologically proven principles and would also review plans for subdivisions and large scale developments in order to circumvent the destructive impact of man on the ecosystem, while simultaneously minimizing the costs of providing adequate services to the public. As a starting point, an analysis of the ecosystem of the county was undertaken.

**The Banks.** The Currituck Banks, once a barrier island chain, now form a slim, elongated peninsula jutting southward from Virginia Beach, Virginia into Dare County, North Carolina. Slightly less than 8800 acres in area, they are 23 miles long and range in width from less than 2,000 feet to more than one mile. Approximately 6,000 years old, the banks were the product of wind and sand and water. Theories concerning their origin vary. They may have been born when a mainland ridge was surrounded by rising sea levels. It is possible that they were generated by the elongation of a coastal sand spit. Another possibility is that they were formed by the gradual rise of an offshore bar. However, it is clear that they evolved into a shifting string of barrier islands. The Currituck Banks are composed of highly mobile sand particles. Constantly eroded and redeposited by the forces of wind and moving water, the particles form a matrix of shifting beaches, dunes, sand hills, plains, and wetlands. Though the strand's mean elevation is only six feet above sea level, a number of the migrating hills tower 75 feet above their surroundings. Inlets have periodically pierced Currituck's length, only to be reclosed by sands settling from longshore currents. Still evident on the banks is oceanic overwash, a process which drives them slowly landward.

Vegetation is the stabilizing element in this dynamic environment. Grasses, shrubs, and scrub forest tracts capture the migrating sands, and the plants' root systems stabilize the porous soils, reinforcing dune systems. The plants' distribution is governed by wind exposure, water supply, and the sands' nutrient supply and salt content. In addition, a fresh water lens underlies the strand in sand and clay deposits. Intensive use of this lens can cause salt water intrusion.

The Currituck Banks topography is difficult to categorize. The shoreface and berm form the first sectors in this system. The shoreface is subject to systematic tidal flooding, while the berm lies above the mean high tide level. Three dune areas follow. The final component in the system is the shore at the interface of the banks and the sound. (Some areas of the Currituck strand are

## The Currituck Ecosystem<sup>1</sup>



### TOLERANCE OF PHYSIOGRAPHIC FEATURES TO MAN'S INFLUENCE

Area	Tolerance	Implications
A. Sound	Medium	Possible Usage*
B. Marsh	Low	Need for Preservation
C. Woodlands	High	Usage Good
D. Secondary Dunes/ Mid-Region	Medium	Usage with Restriction
E. Fore-dune Area	Low	Need for Preservation
F. Beach	Medium	Light Usage**
G. Ocean	High	Possible Usage*

\*Floation structures and transportation areas

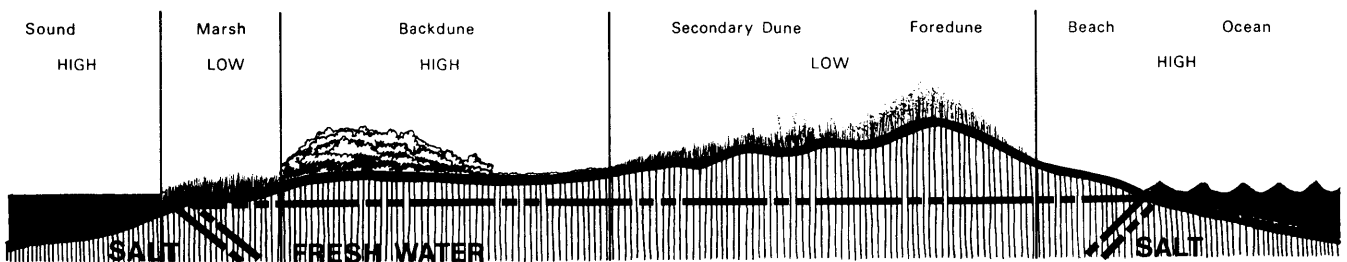
\*\*Non-Permanent structures

Note: Numbers indicate water depth in feet

underground extensive erosion.) Winter storms steepen and narrow the beaches, while summer's gently breaking swells allow sand deposition, widening the berm and shoreface, and giving them a more gentle slope. The Currituck foredune is not continuous and is poorly vegetated. Poor vegetation is characteristic of much of the banks and can be attributed to stock grazing which has occurred in the past.

**The Sound.** Bordering the Banks is the Currituck Sound, a marsh-fringed estuary of extremely low salinity. Though once saline, it has become a fresh water aquatic system. An extensive and productive bass fishery has developed, and its marshes are a critical link in the Atlantic Flyway, providing food for great numbers of migratory water-fowl. It is probably the most productive hunting and fishing area in North Carolina, and it serves as a rookery for many shore birds. It is fed by the Northwest and North Landing Rivers, numerous farm drainage ditches, and by Virginia's Back Bay. It receives much swamp drainage. Much of this influx is slightly acid and low in oxygen. The Sound and its marshes form a complex community of interdependent plants and organisms in an aquatic environment. Through an intricate system of cycles, the community members share vital resources such as nutrients and energy.

The mechanism through which nutrients and energy are shared is the food chain. Plants utilize the sun's energy, in the formation of organic matter. These plants are in turn eaten by herbivorous animals, while flesh-eating carnivores occupy the final links in the chain. Energy flows through the system in only one direction. Thus the Sound community requires a continuous input of sunlight. Nutrients, however, must often be recycled. Decay organisms, primarily bacteria and fresh water worms, provide



**Barrier Island Profile.** As this cross-section shows, the Banks has a characteristic profile of beach, foredune, secondary dune, backdune, and marsh. Each of these areas has its own susceptibility to change, noted here in terms of "high" or "low" tolerance. A fresh water lens lies below the barrier island and meets a subsurface salt water system on both sides. Polluted water can flow laterally in this system, thus underscoring the necessity for sewage disposal systems to have as pure a discharge level as is possible.



this feedback mechanism, breaking down organic debris into forms utilized by the plant community.

**The Wetlands.** Due to the importance of preserving water resources in the coastal area, the natural restrictions of these areas must be of vital consideration in the developmental procedure. In order to effectively deal with these irreplaceable resources, this area is grouped into one land unit. Wetlands include the beach, marsh, and wash-over areas.

The beach is that area under the influence of wave action. During intense storms, water may pass between the beach and Sound through wash-over areas. Sand, suspended in the intruding salt water, is deposited in the marsh, building the barrier island. The marsh is characterized by nutrient rich soils and tall marsh grasses. The most biologically active area on the coast, it is of vital importance to the Sound's and Outer Banks' ecology. Since the beach is cleansed twice daily by the tides, it is able to absorb intense levels of recreational uses. However, the other Wetlands are more delicate and require special care.

Washovers are a natural occurrence aiding in the conservation of land area. If storm pressure is not allowed to move sand to the backside of the barrier island through these washes, it will instead move the particles to deep off-shore banks. Interference with these minimal wash areas will result in sand loss much greater than the immediate land area gained. The Banks' slow, natural, westward migration is essential and should not be impeded by man.

Alteration of marsh levels by dredging and filling has destroyed extensive Wetland tracts along the Eastern seaboard. Even when physically unaltered, the marsh can be damaged by the introduction of pollutants. Again, these natural restraints must be considered in the formation of a development procedure.

While development is possible in the coastal areas, the tolerance of the natural environment to alteration is limited by the characteristics of the system itself. The sensitive dune and vegetation system of the Banks generally limits development to areas away from the foredunes, secondary dunes, marshes (on the Sound side), wash-over areas, and areas of trees and shrubs. While this may seem severely limiting at first glance, the disposition of dunes actually defines a modular system of usable land which has suitable dimensions for cluster and planned unit types of development.

Approached from the point of view of performance, a coastal ecosystem requires that the dynamic system of natural forces be allowed to operate without constraints. Erection of retaining

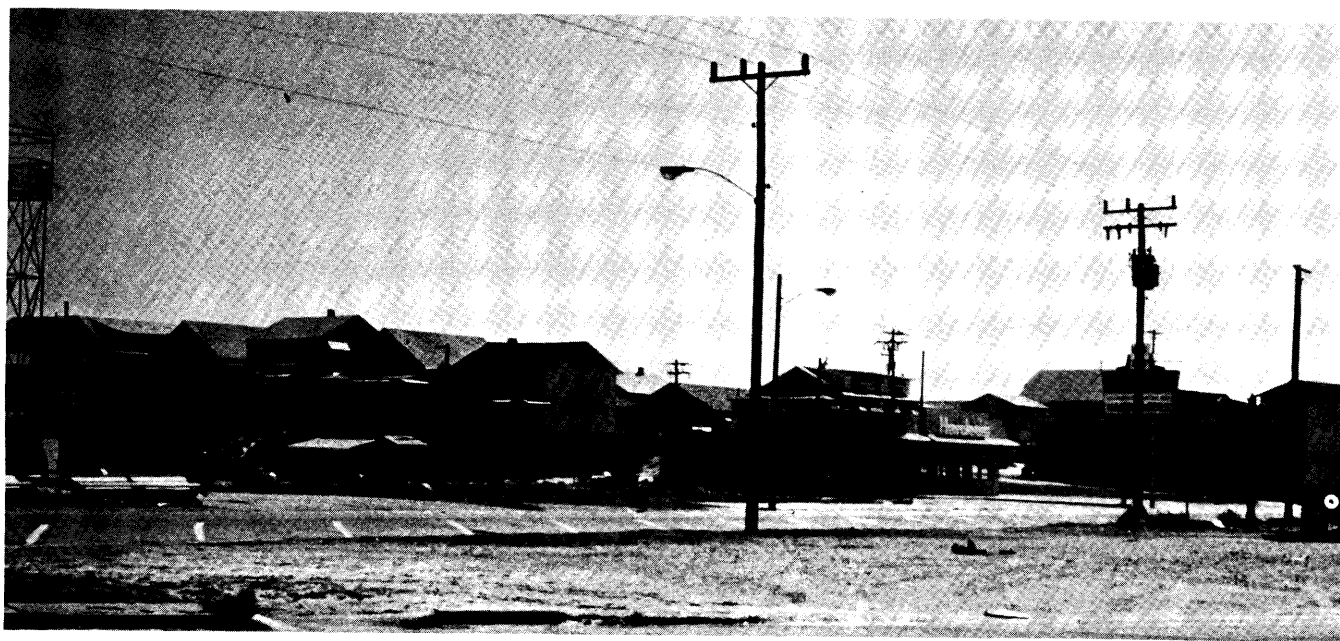
**Currituck County:  
Development  
Pressures on the  
Natural Environment**



walls or fences to stabilize dunes actually results in an intensification of the erosion action of waves. On the other hand, a gently sloping beach and foredune system allows the pounding action of the waves to be dissipated over long horizontal surfaces without destruction of the dunes.

Sewage disposal and fresh water supply represent the two largest problems associated with development of coastal lands. Owing to a constantly high water table, septic tank or other untreated wastes are susceptible to lateral flow and eventual pollution of fresh water supply sources. In addition, high biological oxygen demand levels in the Sound—as required in natural aerobic decomposition of waters—give rise to the production of algae. If septic tanks provide for waste disposal and wells are the means of fresh water supply, then a large portion of the Banks currently zoned at ½ acre minimum lot size will generate high levels of pollution. Excessive dredging induces siltation and turbidity in the waters of the Sound and exacerbates the fresh water supply problem.

Land sales have been building up to a feverish pitch in the past two to three years. Growth projections are impossible in a county with such a small initial population, and estimates of the programmed needs of a growing social and economic system are irrelevant at the moment. Instead, a land development guidance system is needed to insure that neither the amenity of the environment nor the provision of public services suffers in the hands of irrational development patterns. Access can be used as a strategic device for controlling the pace of growth, as can planning and review procedures based on natural principles. These were the initial premises upon which the Currituck interdisciplinary design team began to function in May 1972.



**Unplanned Development.** Coastal communities such as the one shown here, are beginning to discover the price that must be paid for over-development without adequate sewer and water treatment systems and advance planning: Unpalatable water, rising pollution levels in the Sound, beach erosion, ugly and uncontrolled roadside developments, inadequate community facilities and unstable population resources. It was in this context that the Currituck interdisciplinary team began the task of defining a resource management system and comprehensive plan for the county.



## INTERDISCIPLINARY TEAM DESIGN AND PLANNING FOR COASTAL DEVELOPMENT

**Origin.** Proposals in the early 1960's for a road system on the Currituck Banks recognized the need for access to this part of the county. At that time, aside from mainland farming and hunting and fishing interests, Currituck was a thinly populated and somewhat inaccessible county whose beaches were true wilderness areas. The only visitors to the Banks were those who went duck hunting or fishing in the Sound, or whose homes were in the tiny community of Corolla. However, as the cities of Chesapeake, Virginia Beach and Norfolk grew rapidly southwards people began to settle in Currituck and create pressures for community facilities, sewer and water services, and roads. By 1970 a crisis of development was beginning to emerge. Basically a rural county, Currituck was having to respond to waves of families with nonagricultural needs whose work place was elsewhere. The county was, in fact, having to foot the bill for the provision of essential services while another county was reaping the benefits of an industrial and commercial economic base.

In the 1970's the land speculation boom moved from the mainland to include the currently inaccessible Banks. Some landowners with very large pieces of land, often as much as three to four miles long, began to subdivide their property into linear grid systems or canal-fronted spurs. Selling proceeded at a fast pace for a year or more until the county commissioners started to comprehend the impact that this might have on its fiscal structure. They were, and still are, particularly concerned about the costs of providing adequate infrastructural and other kinds of public services. Thus the county commissioners, sensitive to the issues that confronted them, were to become the public client of the interdisciplinary design and planning team.

What was happening to Currituck was also occurring elsewhere in the State, and as a consequence legislative pressure for land use planning emerged with the passage of many important bills dealing with coastal development problems. In 1969 the General Assembly ratified a bill entitled "An Act to Direct the Commissioner of Commercial and Sports Fisheries to Make a Comprehensive Study of the Estuaries of North Carolina." The act authorized the study to produce a "comprehensive and enforceable plan" for the conservation of the resources of the estuaries, the development of their shorelines and the use of the coastal zones of North Carolina. In this same year the North Carolina Land Use Congress was formed out of a composite of professional organizations, governmental agencies, and citizens groups for the purpose of "achieving a quality environment through wise land policy and citizen involvement." This group included among its ranks the Division of Community Planning, the Division of State and Regional Planning and the Association of Soil and Water Conservation Districts—three important North Carolina administrative agencies. From its committee structure the Land Use

### THE CURRITUCK PLAN: ORIGIN, ORGANIZATION, AND OBJECTIVES

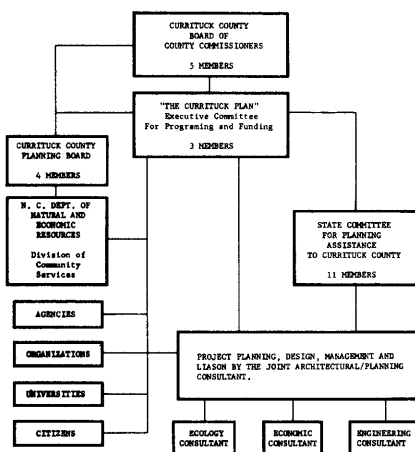
Congress presented many studies and proposals to the administration of Governor Robert W. Scott. Finally, in the 1971-1972 academic year a study by a team of North Carolina State University students showed that development proposals for the Currituck Banks would have a deleterious impact on the natural environment. The effects of human intervention were depicted in terms of the expenditure of large sums of public funds to subsidize the erosion control costs and installation of sewer and water systems. It was also demonstrated that failure to provide such systems might result in severe pollution, siltation and turbidity in the Sound. The scene was now set for positive action.

**Organization.** While it is true that events have a tendency to build up to a point where action must be taken, it is also true that someone must act as a catalyst. Benjamin B. Taylor, a practicing architect in Raleigh and a native of Currituck, became the synthesizing agent among interested, overlapping and sometimes discordant agencies and individuals. With an acute sensitivity to the political objectives of public agencies, and with an equal amount of skill in balancing conflicts which arose between conservationists and developers, Ben Taylor welded together a comprehensive planning framework.

His last preparatory act was to put the interdisciplinary team together for resolving the planning objectives of the county. As Planning Coordinator for the Currituck Plan, he created a team of interdependent and responsive agencies within the planning framework. A radical departure from the traditional client-consultant relationship, the Currituck Plan and its organization represents one of the few interagency, interdisciplinary environmental planning and design projects in which the decision structure is part of the technical planning process.

The basic organizational structure for the Currituck Plan is headed by a five-member county board of commissioners, the clients, and a three-member executive committee specifically charged with programming and funding the plan. The composition of the three-member committee is as follows: H. D. Newbern, Jr., Chairman of the Currituck Board of County Commissioners; Jerry W. Hardesty, Chairman of Currituck County Planning Board; and Art W. Cooper, Chairman of the State Planning Committee for Currituck County. Ben Taylor was commissioned by the executive committee to coordinate the technical planning services for the plan, and these were drawn from an in-house staff of architects and planners from the Raleigh firm of Envirotek and Urban Design Research Group, as well as consultants in the fields of ecology, economics and engineering. Envirotek, as the prime consultant, with Ben Taylor as planning coordinator, also had the responsibility of organizing inputs to the plan from governmental agencies, organizations, universities and citizens groups.

The task of organizing a coherent governmental response required the creation of a special committee formed out of all the key agencies involved in the planning and management of coastal resources. Making governmental agencies work together is no easy task at the best of times; in the Currituck Plan about half the energy of the interdisciplinary team was spent on making the agencies aware of each other's objectives and values.

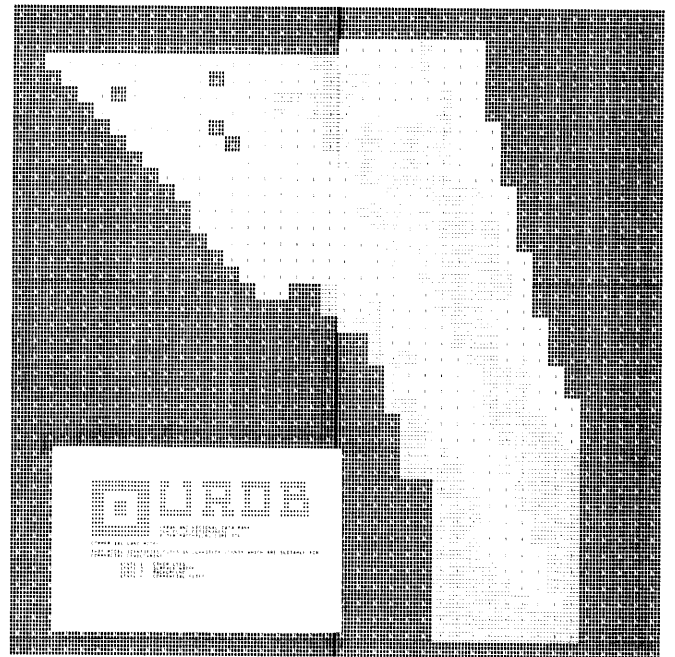
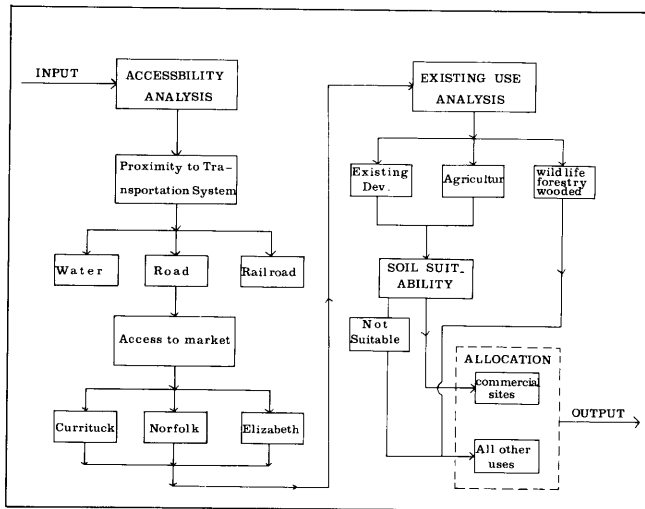
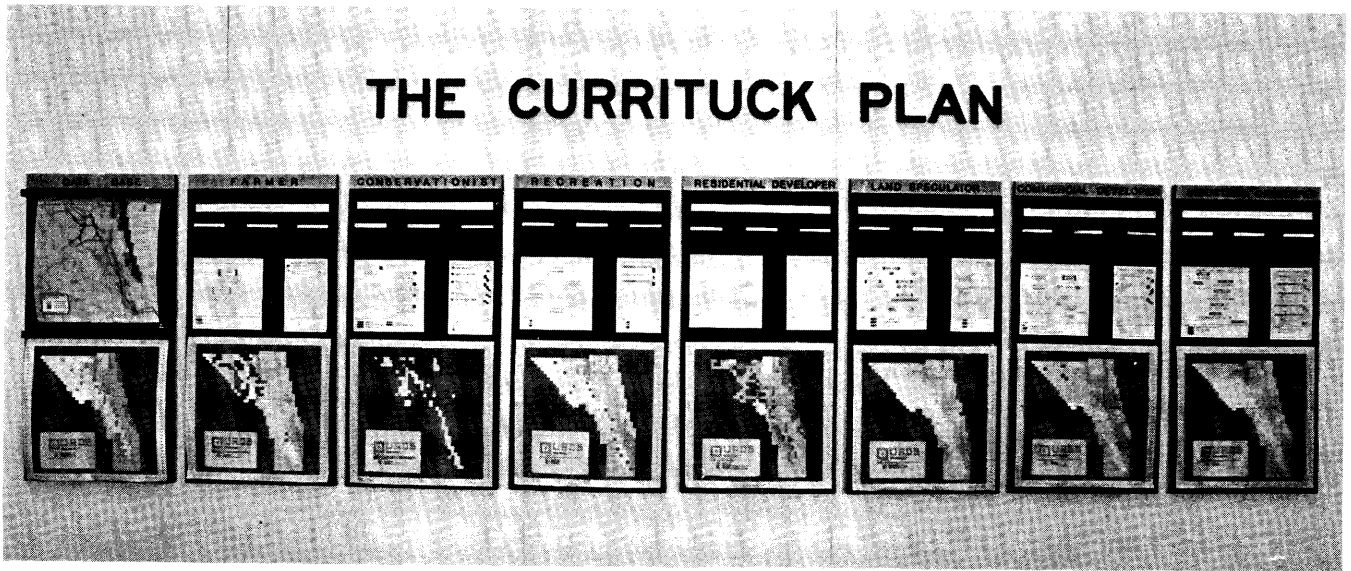


**Currituck Plan Organization**





# THE CURRITUCK PLAN



**Computer Analysis of Land Use.** Decisions associated with complex environmental design problems require vast amounts of data. The Currituck Plan was used as an experimental vehicle for the simulation of user locational preferences and rapid data retrieval by a School of Design team under the author. In many cases the results matched real land use patterns and hence demonstrated the utility of rationalizing and making explicit the decision processes inherent in land development.

**Objectives of the Plan.** The charge from the executive committee was fairly specific. Following a resolution in July 1972 by the Board of Commissioners — one month after the initiation of a one-year moratorium on subdivision proposals and other forms of land development — the interdisciplinary team began work in August within this general framework:

**PURPOSE:** To define the proper development intensity which will maintain the natural attractiveness of the County while enhancing its economic situation.

**OBJECTIVES:** To establish the County as the most attractive area on the east coast in terms of the natural beauty of the fresh water Sound bounded by an Outer Banks strand and an agricultural mainland.

To develop the mainland as an organized truck crop agricultural area, taking advantage of the soil, climate and market access.

To develop the recreational potential of the Sound and Outer Banks for swimming, boating, sailing, fishing, hunting, and the creation of a year-round tourist industry.

To preserve the historic areas of interest and to develop their educational and recreational value.

To protect and maintain wildlife refuge areas and to develop programs for stabilizing the natural features of the Outer Banks and Sound.

To prevent the misuse of the County's scarce and valuable natural resources by adequate planning.

The preparation of plans, the adoption of zoning controls and development standards which will discourage land speculation and encourage proper development.

To establish adequate fiscal policies in the County in order to support an efficient land management system and the provision of adequate public services.

To improve access between the different geographic areas of the County to enhance unity and to provide public access to recreational areas.

To coordinate development with surrounding counties and maintain communication with State and Federal agencies to insure the best development programs for the County.



**Citizen Involvement.** Exposure to community problems and values was high from the initiation of the project. At the termination of each major phase there was a full review by the citizens.



## **INTERDISCIPLINARY TEAM DESIGN AND PLANNING**

One year ago in the May/June issue of *North Carolina Architect* the author and Shafik I. Rifaat advanced a theory called "Comprehensive Design". It was shown that there is a methodological approach to complex environmental design problems through a process which has four constituent elements: Rational methods of analysis, interdisciplinary management, public and private decision-making mechanisms, and community involvement. The author, also Planning Director for the Currituck Plan, thus had a chance to test this theory and to influence the roles played by the contributors to the project. From the very outset, a structure was established which allowed different disciplines to provide an input into the rationale for the plan.

The management system consisted of the same number of steps as outlined in the Comprehensive Design Process: (1) Problem definition; (2) Identification of Resources; (3) Program development; (4) Proposals and evaluation; (5) Detailed Design; and (6) Implementation. Cutting across this phasing sequence were the components of the study:

1. Project Management (Prime consultant)
2. Land Development (Prime consultant and planning consultant)
3. Access (as above)
4. Comprehensive county planning (as above)
5. Ecological Systems Analysis (Ecology consultant)
6. Economic Systems Analysis (Economic consultant)
7. Engineering Systems Analysis (Municipal services engineering consultant)

Each consultant was coordinated through the project management component and was required to attend joint planning sessions and public presentations. This had a positive effect on the contribution made by the consultants owing to the fact that they could not merely provide technical expertise to a prime consultant without having to defend it. It also had the advantage of allowing all the technical expertise to participate in the planning process.

Interdisciplinary planning and design is a subject currently very much in vogue. What most people mean when they use this phrase is that by concentrating a variety of specialists in a problem-solving session there will be a productive synthesis of ideas, and one that is far superior to the traditional single-discipline approach. Such a concept is much easier to talk about than to practice, mostly because the nature of our training is to specialize in a narrow field. Consequently, the typical flow of ideas comes from political pressure (the people) to a corporate agency (client) to a specialist consultant. The consultant then works on the problem and presents a solution to the client, who in turn presents it to the public. Lack of direct contact leads to a high probability of misunderstanding the values of the people for whom the plan is being prepared, and specialization of technical services runs the risk of serious oversights in areas not familiar to the consultant. The Currituck Plan, however, involved governmental agencies, citizens and technical expertise in joint planning and review sessions from the start.

## CURRITUCK BANKS DEVELOPMENT CONCEPTS

**Phasing.** The Currituck Plan has been divided into four analytic phases. The first two — Phase I, Outer Banks Development Situation, and Phase II, Outer Banks Development Potential — form the basis for the concepts described here. The remaining two phases deal with the entire county's growth potential and resource management and are currently being conducted by the prime consultants. It was anticipated that the study would take about six months to complete.

**Scales of Analysis.** A framework was established in which five descending scales of analysis could be conducted: Mid Atlantic region, Tidewater region, Currituck, Outer Banks, and prototypical sites. Each analytic scale represented a set of external influences and environmental constraints which affected planning decisions. For example, the Mid Atlantic, Tidewater, and Currituck scales of analysis were the primary levels at which access alternatives could be proposed. Alternatively, the Outer Banks and prototypical sites scales of analysis were the primary levels at which land development projects and housing layouts could be studied. This method of examining external influences and environmental constraints proved to be highly effective in planning sessions with government officials and citizens.

**Grid Planning System.** A grid system based on the North Carolina Plane Coordinate System was utilized for purposes of data collection and future computer analysis of land use suitability. The grid system consists of a series of coterminous grids — 10,000' x 10,000', 2,000' x 2,000', 500' x 500', and 100' x 100' — each one of which holds specific land use planning information. Both of the two larger grids have been used in the study, and it is anticipated that a county land use plan and resource management system will eventually be built on the 2000' grid system. The computerized data mapping and land use analysis undertaken by a university research team as mentioned earlier was based on an experimental 5000' grid system.

**Development Framework.** Planning as an indicator of the citizens' development of his own environment is effectuated by a combination of two things: Public investment and public policy. This combination is referred to as the "Development Framework". Each element of the framework may be applied independently of the other, but the result is disorderly and uneconomic growth. For example, public investment in roads and sewers may be carried on without a planning policy, and as historically documented material shows this can be a very uneconomic method of operation for a government. Similarly, planning policies may be devised independently of those for the physical systems and facilities of a county, and the end result is usually uncontrolled, uncontrollable growth. There is clear evidence to show that sound development requires a close fit between public investment — i.e., fiscal and budgetary policies — and public planning policy. Thus, planning for the Outer Banks was evaluated in terms of the concept of a development

### STRUCTURE OF PLANNING STUDY

framework. As an extension of this idea, the development potential is the result of adding private investment capability to the public framework already established. Public and private investment are, of course, interdependent, and activity in one usually calls forth a response in the other.

The concept of a development framework of public investment is not new. Sometimes referred to as the "capital framework", or the "public infrastructure", this concept expresses an attitude that public investment and public planning policy can act as the leverage mechanisms to control private actions. It is a sophisticated notion which offers a workable alternative to the administrative and legislative methods of land use control, such as zoning and subdivision regulations.

**Land Development Planning System.** Since one of the goals is the utilization of computer technology to assist in decision-making on comprehensive plans, then a rational approach to land planning had to be devised for the Currituck Plan. The land development planning system is composed of the following elements: System flow diagram, which illustrates the relationships and order of planning activities; an identification of resources matrix which illustrates the varying physical planning areas in relation to the development systems; a uniform method for data retrieval and mapping; and an evaluation system that is used to establish certain development priorities. These elements, when ordered and combined with a built in mechanism for feedback or re-evaluation, produce a system for planning in the present or future in Currituck County.

As is frequently the case, planning studies tend to present end-state solutions without identifying alternative plans, and without revealing evaluative criteria. An evaluation system was devised for the Currituck Plan to test the alternative access solutions to the Outer Banks. The system is applicable to any plan proposal at any of the five analytic scales mentioned previously. It consists of a self-administered survey in which the evaluator, a governmental administrator or citizen, writes down his own objectives, rank orders them, and then proceeds to indicate the degree of satisfaction achieved in a proposed plan or policy. The product of the system is a quantified measurement of the effectiveness of a plan to meet the objectives, and hence values, of the person using it. It has the advantage of making values manifest and for ranking them for trade-off purposes.

**Prototype development concepts.** Some indication of the tolerance of the natural system to man's influence has already been given in the opening section. Studies were made of structure of the Currituck Banks to determine those areas which could support development. This was defined in terms of the capacity of the natural system to sustain alteration without erosion of the dunes and beaches, and without causing pollution of the ground water system. The Banks has a characteristic structure which reflects a modular system of high dunes moving slowly towards the southwest under the influence of prevailing winds. A section through the Banks also shows a characteristic structure of beach, foredune,



## DEVELOPMENT GROWTH POLICIES

I. No ( Further )  
Development

II. Partial  
Development

III. Full  
Development

Development Component	Outer Banks			Shore-line Policy		Mainland		
	none	partial	full	controlled	un-controlled zoning only	partially controlled	controlled	
Access								
none to O/B	1	●			●			●
	2	●			●	●		
E/W + spurs	3	■	●	●			●	
	4	■	●	●		●		
	5	■	●	●			●	
N/S	6	■	●	●			●	
	7	■	●	●			●	
	8	■	●	●	●	●		
	9	■	●	●	●		●	
E/W + N/S	10	■	■	●	●		●	
	11	■	■	●	●	●		
	12	■	■	●	●	●	●	

full & partial  
development  
implied

full  
development  
implied

full  
control

range of control

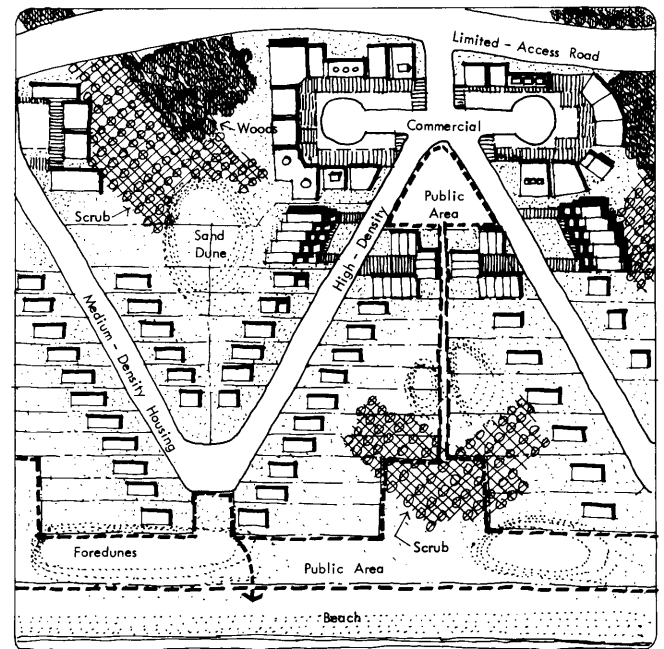
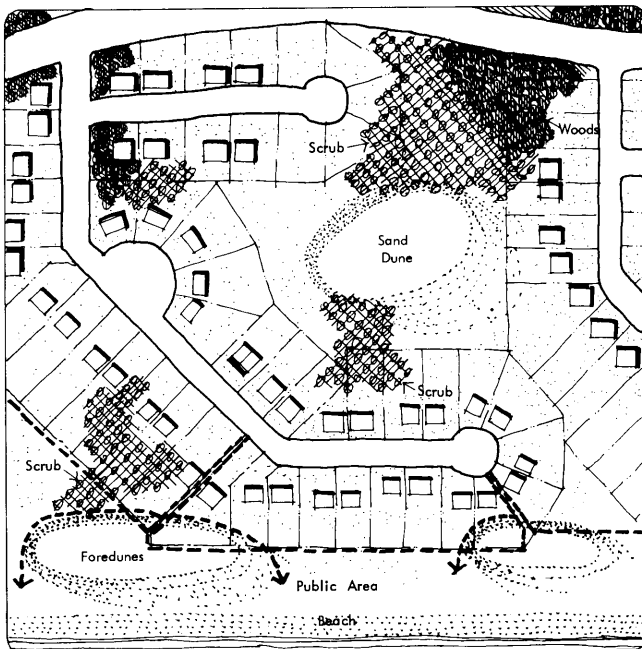
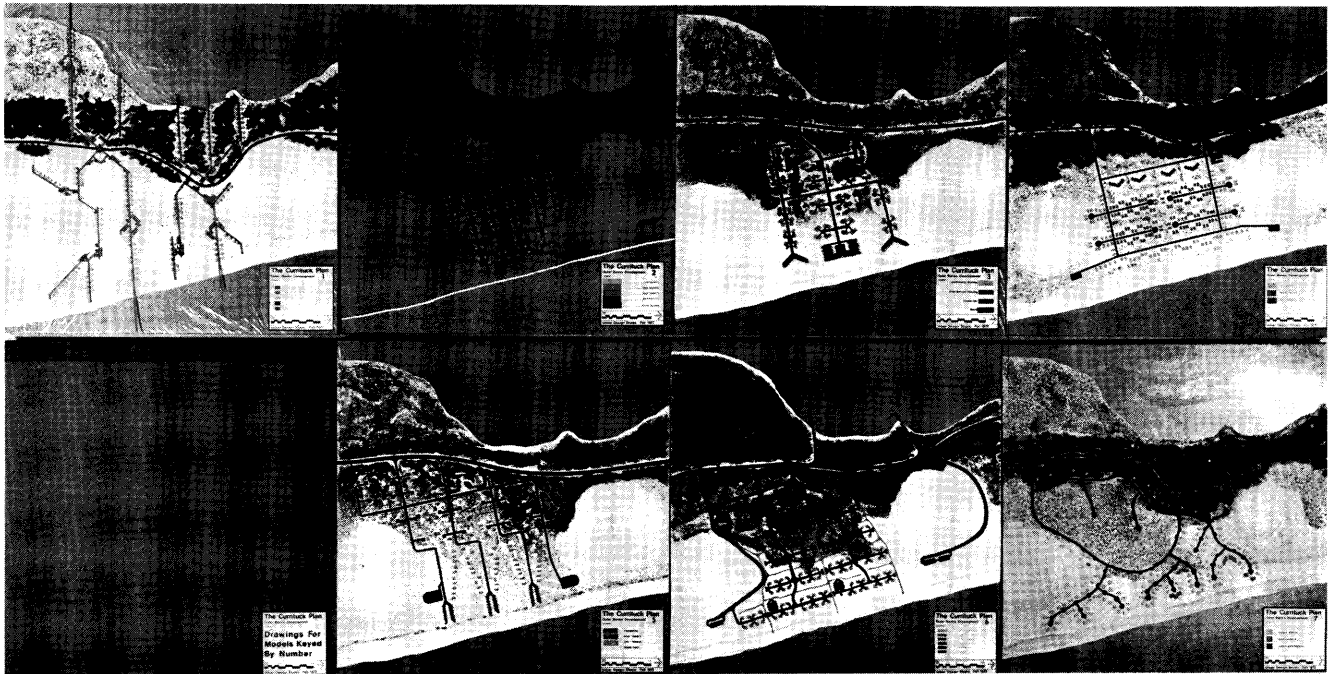
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## LAND USE SUITABILITY ANALYSIS

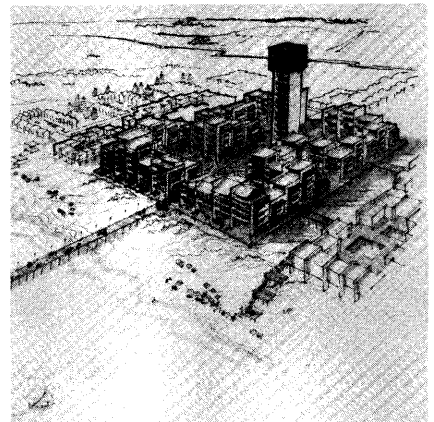
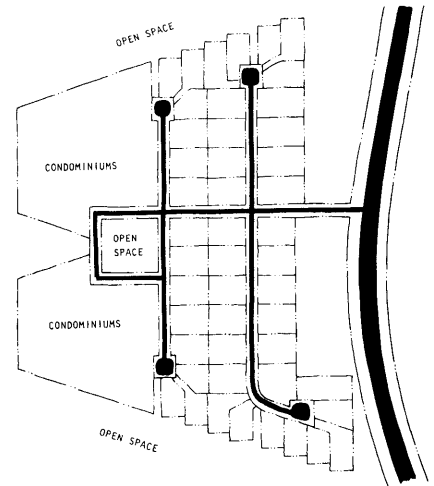
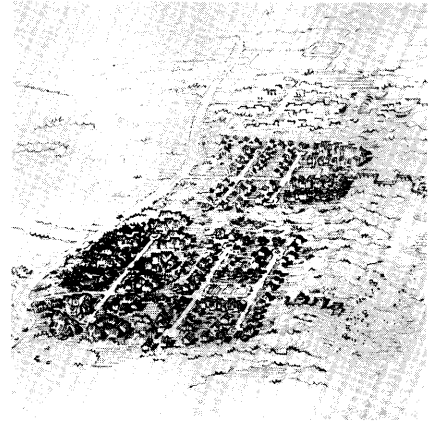
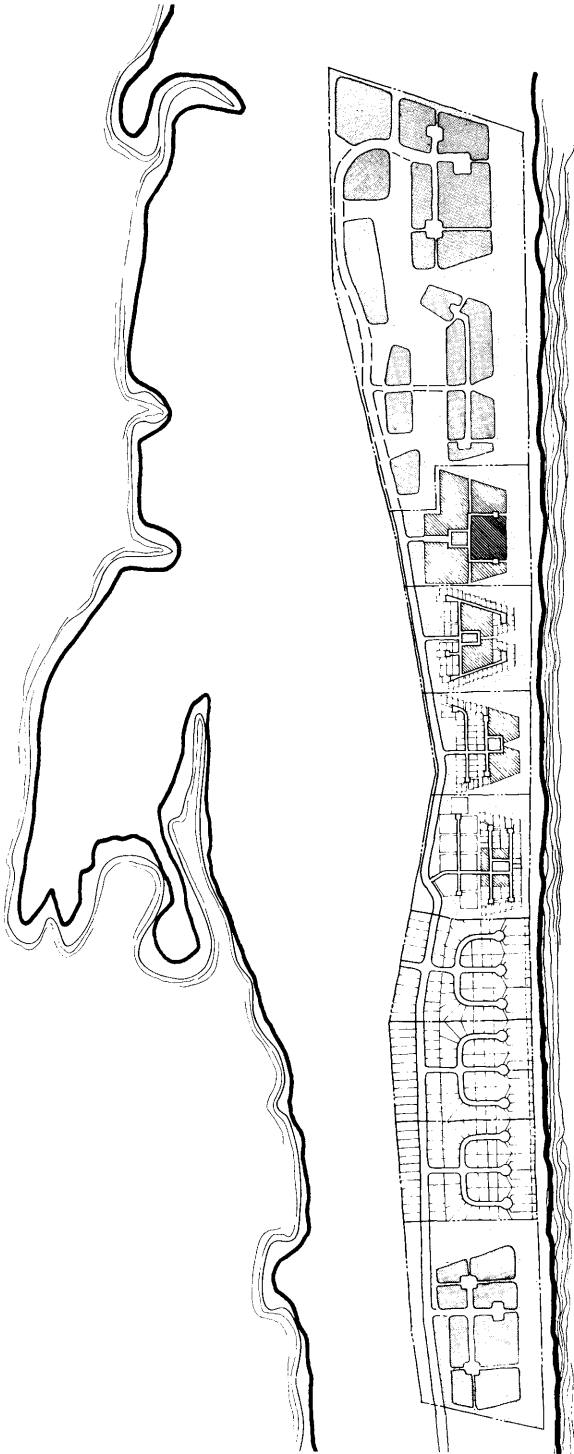
- A. Primary Residential
- B. Tourist Residential
- C. Recreation Residential
- D. Sport Recreational
- E. Agriculture
- F. Forestry
- G. Fresh Water Commercial Fishing
- H. Salt Water Commercial Fishing
- J. Industry

DEVELOPMENT  
FRAMEWORK

**Concept of Development Framework.** This diagram shows how access alternatives and land use control alternatives are integrated to produce various development growth policies. These policies can then be compared with land use suitability maps and the resulting combinations establish the development framework within which growth can take place. This methodology was employed to provide a systematic approach to comprehensive planning in which alternatives could be properly compared.



**Prototype Site Development Concepts.** Given the characteristic structure of the Banks as described previously, one of the problems is to create site plans which satisfy both the natural constraints of the environment and the investor's economic criteria. Photograph of seven models at top shows an attempt to create alternative site development concepts which match or surpass investor's economic criteria. Two concepts below are prototypes for exploring new ways of subdividing land on the Banks. Staggered lot line concept on right has been successfully applied in California.



**Application of planned unit development concept to Currituck Banks.** One of the first developers to see the merit in ecological design principles, James Johnson of Ocean Sands development corporation agreed to work with Design Workshop, a firm of Landscape Architects and consultants to the Currituck Plan. Working closely with the prime consultants, the client-designer team created a sensitive plan for the use of the site, which also leaves about 30% open space to the public. This is made possible by the use of the planned unit development concept and its variable internal density.



secondary dune, backdune, marsh and sound. Dune grasses and low plants usually occur on the foredune and secondary dune, while the backdune usually contains trees, shrubs and other stabilizing vegetation.

It is possible to derive some physiographic principles of development from this system. Generally speaking, development should occur only in those areas between the foredune and backdune, avoiding stabilizing elements such as trees and shrubs and dynamic elements such as the high dunes. Looking at the current pattern of coastal development one can see its total insensitivity to the natural system. Consequently, beach erosion, washovers, and water supply problems tend to be very severe on developed sections of the Outer Banks.

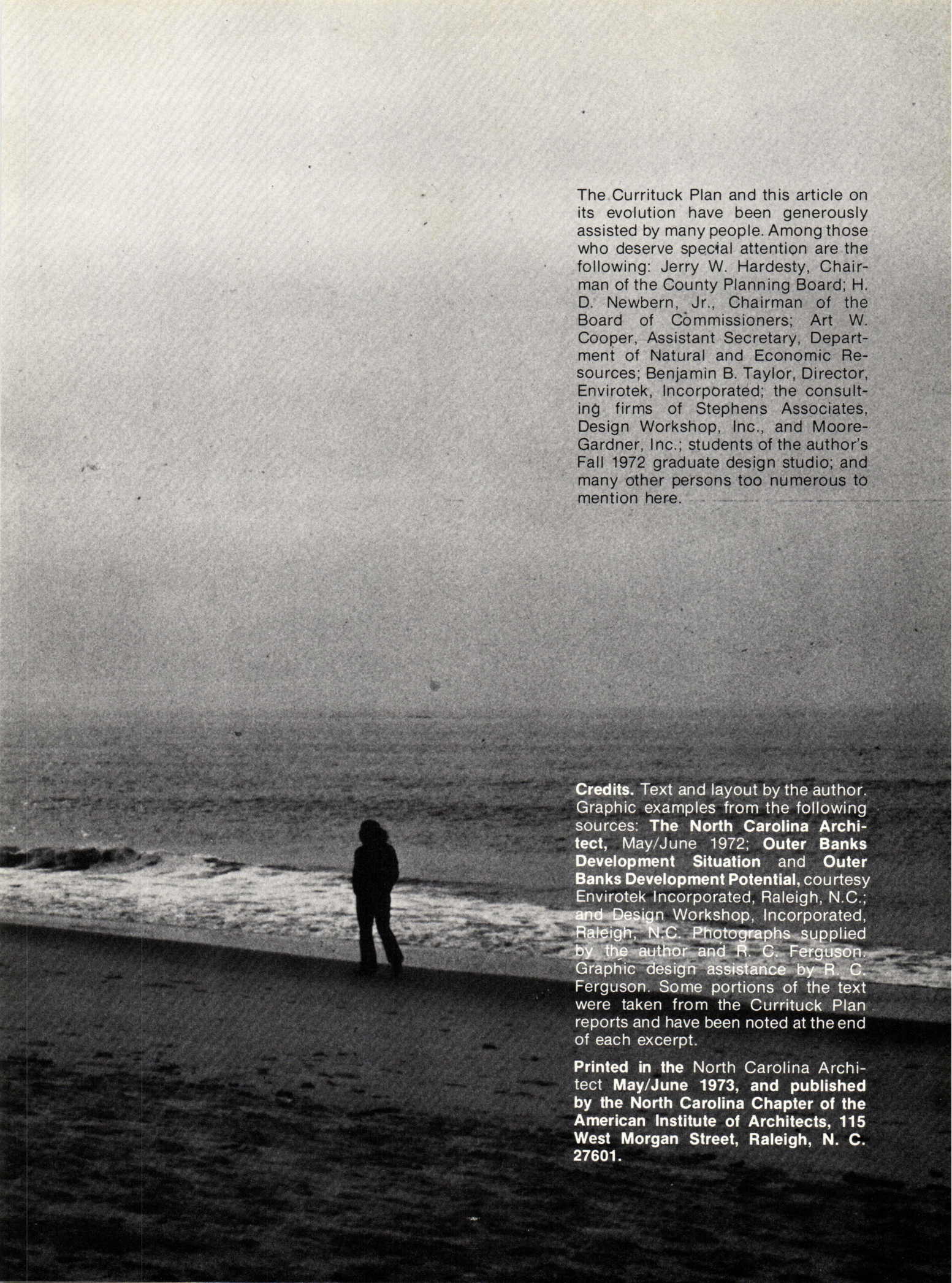
The consultants studied several prototype concepts of residential and commercial developments containing a range of densities. One of the important aspects of site planning for this narrow section of land is that view and access to beach areas become important determinants of both land value and aesthetics of development. Some experimentation with staggered lot lines has been undertaken to relieve the high economic gradient which exists between beach frontage properties and inner banks properties, and it has been shown that a larger number of people can have view and access to the ocean and sound. More important is the fact that by relieving the ocean frontage of the pressure to develop, higher building densities can be achieved in those parts of the banks which are the most stable.

The published Currituck Plan report "Outer Banks Development Situation" contained several examples of prototype site planning concepts. Towards the end of the current period of planning one of the owners of a large tract of land decided to replan his property according to the prevailing physiographic constraints. The result was a series of Planned Unit Developments (PUDs) of variable density and design which will grow according to the market demand and the investor's economic criteria, and which also reflected the natural characteristics of the landscape. Large areas of the most environmentally sensitive parts of the site were reserved for public open space, and the developer has agreed to install a sewer, water and internal road system in concert with the economic policies of the county government.

## Conclusion

Planning for the Currituck Banks has only just begun. It will be many years before we shall be able to test the effectiveness of the interdisciplinary approach to coastal development described here. Nevertheless, the planning approach adopted for the Currituck Plan has clearly demonstrated that citizens and technical expertise can enter the decision-making arena in a productive manner. Currituck may well be the national proving ground for cooperative planning between government and private enterprise in which the values of the citizens and the characteristics of their natural environment play a vital role.



A black and white photograph of a person standing on a beach, looking out at the ocean under a cloudy sky. The person is silhouetted against the lighter beach and water. The sky is filled with soft, textured clouds. The water shows gentle waves breaking on the shore.

The Currituck Plan and this article on its evolution have been generously assisted by many people. Among those who deserve special attention are the following: Jerry W. Hardesty, Chairman of the County Planning Board; H. D. Newbern, Jr., Chairman of the Board of Commissioners; Art W. Cooper, Assistant Secretary, Department of Natural and Economic Resources; Benjamin B. Taylor, Director, Envirotek, Incorporated; the consulting firms of Stephens Associates, Design Workshop, Inc., and Moore-Gardner, Inc.; students of the author's Fall 1972 graduate design studio; and many other persons too numerous to mention here.

**Credits.** Text and layout by the author. Graphic examples from the following sources: **The North Carolina Architect**, May/June 1972; **Outer Banks Development Situation** and **Outer Banks Development Potential**, courtesy Envirotek Incorporated, Raleigh, N.C.; and Design Workshop, Incorporated, Raleigh, N.C. Photographs supplied by the author and R. C. Ferguson. Graphic design assistance by R. C. Ferguson. Some portions of the text were taken from the Currituck Plan reports and have been noted at the end of each excerpt.

**Printed in the North Carolina Architect May/June 1973, and published by the North Carolina Chapter of the American Institute of Architects, 115 West Morgan Street, Raleigh, N. C. 27601.**





Upon a motion made, duly seconded, and unanimously approved, the Board of Commissioners of Currituck County adopted the following resolution, given under my hand and official seal this the third day of July, 1972.

  
Clerk to the Board

WHEREAS, the Currituck County Planning Board and the Currituck County Board of Commissioners have determined that in order to insure orderly development within the County, a comprehensive land use and economic study is needed, and

WHEREAS, the development and commercialization characteristic of much of coastal North Carolina are now focusing on Currituck County, and

WHEREAS, the unique natural beauty of the Currituck Banks, the abundant fishing in the waters of Currituck Sound, the hunting that flourishes in the County, and the many other attractions which make up the heritage of Currituck County may be jeopardized by the rate of growth and the types of development that are taking place, and

WHEREAS, the intricate and delicately balanced natural systems which have functioned in Currituck County with only minor changes for thousands of years may be drastically altered within a decade if uncontrolled growth and development continue, and

WHEREAS, the environmental study of Currituck by students at North Carolina State University under the direction of key faculty members indicates that development can co-exist with the environment through an understanding of the natural restrictions, and

WHEREAS, Currituck County, as part of the ten county region "R" which has been officially designated as an economic development district, should participate in the planning and growth management activities of the region as its own plans are developed, and

WHEREAS, organizations, agencies, and citizens outside Currituck County have offered their resources and services to assist in the development of a plan for orderly growth consistent with the natural environmental process, and

WHEREAS, one of the keys to development is access, consideration should be given to developing and controlling access to areas of the county to insure balanced development, and

WHEREAS, the North Carolina Department of Natural and Economic Resources, with its offices and divisions organized for assisting growth management and planning, and identifying environmental concerns has offered its support, and has designated Currituck County as a pilot project for planning in the coastal region, and

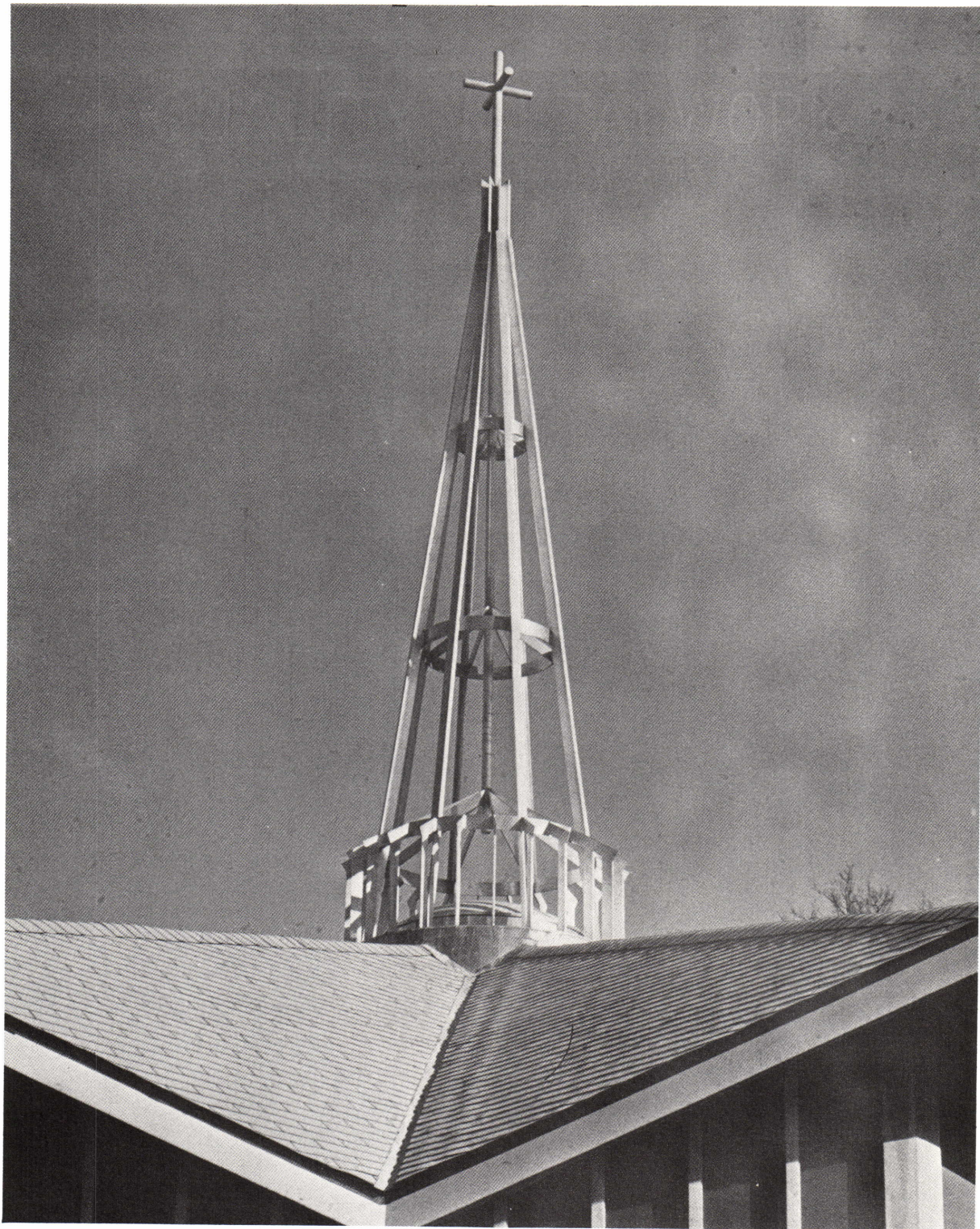
WHEREAS, the Honorable Robert W. Scott, Governor of the State of North Carolina has offered the expertise of the State by appointing an eleven-member inter-departmental committee to work with the County in its relations with the various departments of State Government in planning for the County, and

WHEREAS, a moratorium on approval of sub-divisions has been declared until the first of July, 1973, to allow time for planning and evaluating present and future needs in such areas as utilities, police protection, school facilities, and other services required to support development, and

WHEREAS, funds have been appropriated for initiating the development of a Land Use and Economic Plan for the County, now

THEREFORE, be it resolved that this Board of Commissioners authorize and empower the three man Executive Committee for Programing and Funding to proceed with the planning as proposed in the document entitled THE CURRITUCK PLAN dated June 30, 1972, insofar as funds are available.





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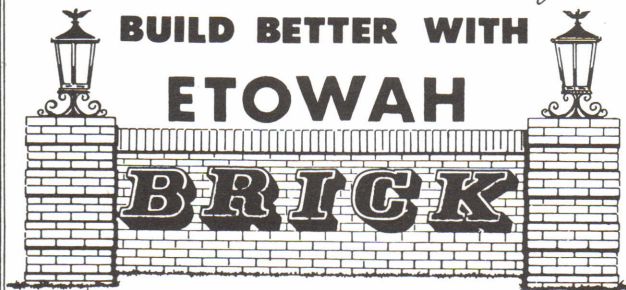
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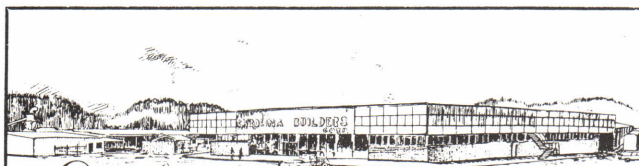
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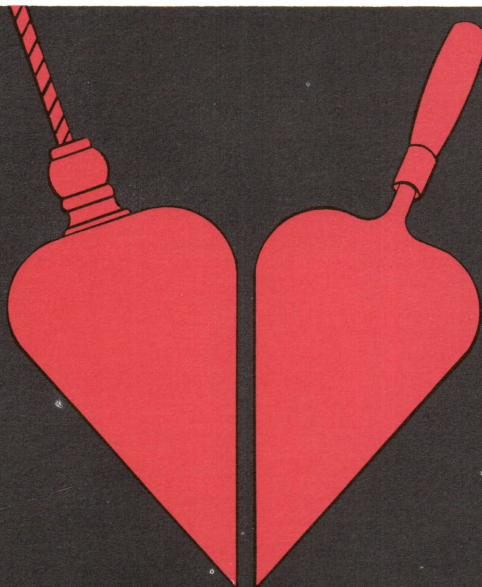
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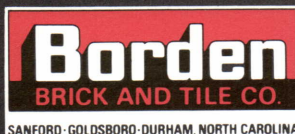
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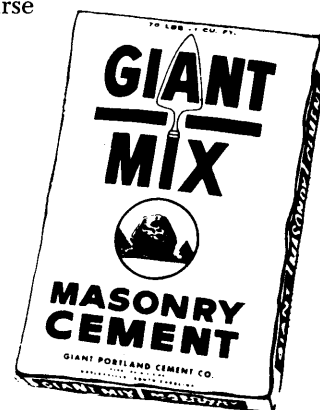
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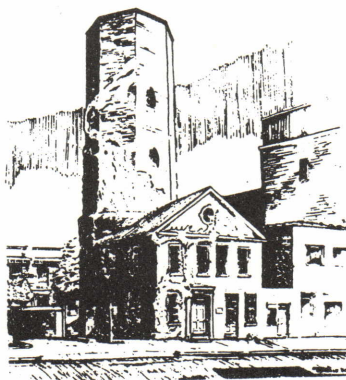
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